

Dust Mitigation Strategies for High Pressure Oxygen QDs, Phase I

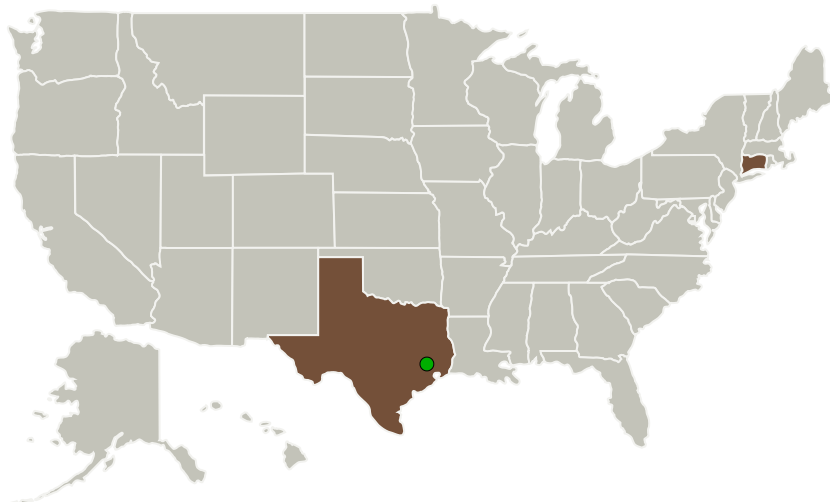
Completed Technology Project (2016 - 2016)



Project Introduction

As human spaceflight once again moves toward planetary exploration, space suit hardware must be ready to face the harsh environmental conditions of these surfaces. This is especially true for High Pressure Oxygen Quick Disconnects. These systems are critical life support items that enable the flow of breathing gas, water, and electrical & communication signals from the suit to the vehicle or habitat. Lunar and Martian dust and regolith can have a detrimental effect ranging from an annoyance during mate & demate, to a severe hazard through contamination of the breathing gas lines. The work proposed in this effort will focus on dust mitigation strategies that can be used in a variety of High Pressure Oxygen Quick Disconnects. As a test bed for this effort, Air-Lock will focus on the existing connector designs of the EMU SCU/DCM Multiple Connectors, and the CSSS T-Handle Multiple Connector. However, the task will determine dust mitigation strategies that will be extensible to any existing or future connector design. The first step in this process is identifying the effects that dust and regolith will have. The next step will be a multifaceted approach, we will look to mitigate dust through 1) material and coating technologies 2) mechanical design features such as purges, wipers, and dust seals 3) connector covering and shielding. After a variety of dust mitigation options are developed, the third step in this process will be implementation of the strategies into the connector designs. The final step in this process will be testing of the strategies through samples and mock-ups in a simulated dirty environment.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Air-Lock, Inc.	Lead Organization	Industry	Milford, Connecticut
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Connecticut	Texas

Project Transitions

▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139589>)

Images



Briefing Chart Image

Dust Mitigation Strategies for High Pressure Oxygen QDs, Phase I
(<https://techport.nasa.gov/image/137240>)



Final Summary Chart Image

Dust Mitigation Strategies for High Pressure Oxygen QDs, Phase I
Project Image
(<https://techport.nasa.gov/image/133532>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Air-Lock, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

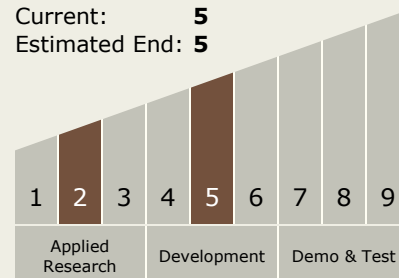
Carlos Torrez

Principal Investigator:

Brian Battisti

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.2 Extravehicular Activity Systems
 - └ TX06.2.2 Portable Life Support System

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System